Department of Toxic Substances Control

Doc. No.

Hull Preparation: Scraping and Sanding

Pollution Prevention For Marine Vessel and Service Repair Facility

It is necessary to remove old, flaking and damaged paint before applying new paint. Three common methods for removal of rust, marine growth, antifouling paint and other coatings are: physical removal (scraping), mechanical removal (sanding and [i] media blasting) and chemical removal [ii] (stripping). Different methods are used for different projects at MVSR facilities, depending upon the sizes and types of boats.

Physical Removal: Scraping

If conditions require limited paint removal (such as crazing, intercoat peeling, solvent blistering, and wrinkling), scraping and hand sanding should be the first methods employed before using mechanical means. The goal is to selectively remove the affected layer or layers of paint.

Scraping is usually accomplished with either a putty knife or paint scraper, or both. After scraping, the uneven surface created by the removal of the various paint layers will need to be smoothed or feathered prior to repainting.

Mechanical Removal: Sanding

Sanding is a means to smooth or polish surfaces by grinding or rubbing with an abrasive such as sandpaper. Sanding is done manually or with a mechanical sander.

Often, **dry sanding** is done with a vacuum sander. A vacuum sander is a power tool designed to use abrasion from sandpaper to achieve the necessary finish. Using vacuum sanders ensures that any waste is easily and safely contained for offsite disposal. This eliminates the potential for polluting the environment.

Wet sanding may also be used with a mechanical sander. Wet sanding does not produce airborne dust. Any residue that it does produce can be removed easily with a sponge after sanding is done. Also, the sandpaper lasts longer since water keeps the sander from getting clogged with sand dust.

Environmental Concerns:

Scraping and sanding boat hulls generates paint chips and dust. These particles normally contain heavy metals such as copper. Heavy metals are used as a biocide in bottom paints to prevent the growth of marine life on boat hulls. Antifouling paint (AFP) products contain active ingredients such as copper oxide, copper hydroxide and cuprous thiocyanate. These products as applied to boat hulls are known to be a major source of copper, particularly during dry-weather periods. Wet sanding produces waste water contaminated with metal containing paint residue that can potentially damage surrounding surface water.

TARGETED POLLUTANTS:

- Metals
- Paint chips
- Sanding Dust
- Spent Abrasives
- Trash and Debris

Most of the dust is collected with vacuum sanding.

Regulatory Requirements:

1. California Air Resources Board [iii](www.arb.ca.gov):

    - Statewide Portable Equipment Registration Program [iv](PERP)
    - Abrasive Blasting Program [v] (Certified Abrasives)

2 State Water Quality Control Board [vi] (www.swrcb.ca.gov):

    - National Pollutant Discharge Elimination System [vii] (NPDES Permit)

3. Department of Toxic Substances Control [ix] (www.dtsc.ca.gov): [viii] (Treatment Permit)

4. California Division of Occupational Safety and Health [x] (CAL/OSHA)

    - Personal Protective Equipment [xi] (PPE)

Recommended Practices (RPs) for Scraping and Dry Sanding

1. **Designated Area**: A clearly marked area that is far from the surface waters and out of drainage path ways.

    - Locate in a building with proper ventilation and filters
    - Ground surface must be impervious such as sealed asphalt or concrete (not over open ground)
    - Area must be bermed to contain the dust and prevent it from washing away
    - If concrete or asphalt is not available, place a durable or heavy tarp on the ground.

2. **Dust Management**: Every precaution must be taken to prevent sanding dust, paint chips and spent abrasives from reaching storm sewers or receiving water.

    - **Use dustless vacuum sanding machines** that are highly efficient in reducing concentrations of airborne dust. They prevent release of toxic materials and particulates.
    - Before work begins, cover the vessel completely.
    - Hang plastic barriers or tarpaulins around the vessel to contain debris from sanding activities
    - When dust is visible, containment is incomplete and/ or the sanding equipment is saturated.

3. **Cleanup**: Cleanup must be scheduled for the end of the shift and/or when the project is complete. Avoid tracking dust from the work area to other parts of the shipyard.

    - Use a vacuum to capture fugitive dust from equipment used and the work area.
    - Do not use a sweeper or other equipment in a manner that causes sanding dust to become airborne
    - Work area must provide a clearly marked receptacles to collect sanding dust and paint chips
    - Collect spent abrasives routinely and store appropriately for offsite disposal.
    - Paint waste must be tested to determine if it is a hazardous waste, If test is positive, then paint waste must be disposed of as vihazardous waste by a licensed hauler.

4. **Good Housekeeping**: Good housekeeping and management practices require implementation to pro mote pollution prevention during sanding activities.

    - Prohibit sanding activities during windy conditions
    - Establish process and schedule for equipment maintenance and abrasive replacement
    - Schedule routine site inspections to ensure RPs are implemented
    - All RPs must be reviewed periodically and revised as necessary
    - Train employees on proper sanding, waste management and disposal procedures.
    - Restrict sanding to trained employees only.
    - Emphasize safety concerns for on the job training of operational procedures
    - Updated training should be done on a regular basis.

- Provide and encourage staff to use personal protection equipment (PPE) such as Tyvek suits, gloves, masks, etc.
- Provide educational materials and signage in both English and Spanish, and/or other foreign languages commonly used in your area

Recommended Practices for Wet Sanding

- Waste water must NOT be discharged directly into surface waters
- Perform wet sanding on a pressure wash pad where the wastewater is collected, pretreated, and removed from surface waters
- Designated area, such as a pressure wash pad, should be an enclosed area that is paved, bermed and sloped to contain waste water
- The designed flow capacity of the waste water collection and pretreatment system must be adequate to handle the wastewater flows
- Pretreatment system must be adequate to receive and pretreat all of the waste water generated
- The pretreated waste water may be recycled for industrial use
- Filters must be periodically replaced to maintain pretreatment system effectiveness
- Inspect and clean sediment traps periodically to ensure that solids are intercepted and collected prior to entering the pretreatment system
- Slurry and grit collected from filters and settling tanks must be removed and disposed of properly
- Dispose of wash water sludge or debris at an approved facility (e.g., your local waste management authority, hazardous waste facility)
- Do not dispose of sludge in a sanitary sewer.

References and Other Resources:

I. http://www.dtsc.ca.gov

II. http://www.dtsc.ca.gov

III. www.arb.ca.gov

IV. http://www.arb.ca.gov/portable/portable.htm

V. http://www.arb.ca.gov/ba/certabr/certabr.htm

VI. http://www.swrcb.ca.gov/

VII. http://www.swrcb.ca.gov/water_issues/programs/npdes/

VIII. www.dtsc.ca.gov

IX. http://www.dtsc.ca.gov/HazardousWaste/Tiered_Permit_Guidance.cfm

X. http://www.dir.ca.gov/dosh/puborder.asp

XI. http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9777

Comparing Wet Sanding and Dry Sanding Methods:

Wet sanding or dry sanding may be used to remove bottom paint. If you have a heavy buildup of dry paint, sanding may be required to remove the bulk of it. When you get close to the gelcoat, switch to wet sanding to finish the job

	Dry Sanding	Wet Sanding
Typical Use -	Removal of heavy buildup of paint to eliminate the bulk of it	After the bulk of paint is removed and you are close to the gelcoat
Desired finish -	Scuffed surface for paint to adhere	Fairly smooth finish is desired
Sand paper -	Sand paper must be replaced often as it becomes saturated with sanding debris.	Sand paper lasts longer since debris floats away from the sand paper.
Dust Suppression -	This method generates lots of dust.	Dust is not an issue as water carries the debris away
Environmental impact -	Vacuum sander must be used to mitigate air pollution.	Waste water must be contained, collected and pretreated
Waste –	Sanding dust must be tested to determine if it is hazardous; and if tested positive; then it must be disposed as hazardous waste by a licensed hauler.	Waste water must be tested to determine if it is hazardous, and if tested positive; then it must be disposed as hazardous waste by a licensed hauler.

For additional information on auto body and paint shop pollution prevention practices and a list of available publications contact:

DTSC
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P.O. Box 806
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(916) 322-3670
(800) 700-5854
http://www.dtsc.ca.gov/PollutionPrevention/index.cfm

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